SEVERE LOCAL STORMS.

[The table herewith contains such data as have been received concerning severe local storms that occurred during the month. A more complete statement will appear in the annual report of the chief of bureau.]

Place.	Date.	Time.	Width of path (yards).	Loss of life.	Value of prop- erty de- stroyed.	Character of storm.	Remerks.	Authority.
Elizabethton, Tenn Duval County, Fla	7 17–18					Wind, rain, and hail. Northeast gale	Houses blown from foundations; trees and tele- phone poles blown down. High tides and waves on coast destroy bulk- heads and damage cottages and piers.	Official, U. S. Weather Burcau. Florida Times-Union (Jacksonville).
Connecticut coast	23	P. m		ļ		with hail.	Church steeple and barn wrecked and windows blown in at Milford; minor damage elsewhere along coast.	Courant (Hartford, Cenn.); Republican (Springfield, Mass.).
New York, N. Y	26	4.40 p. m		1		Wind	Heavy sign blown down; 5 people injured	New York Herald (N. Y.).

STORMS AND WEATHER WARNINGS.

WASHINGTON FORECAST DISTRICT.

Unsettled weather conditions prevailed over the Gulf of Mexico and the northwestern Caribbean during a large portion of the month and several disturbances of importance were charted, in contrast to the lesser activity on the Atlantic seaboard.

At 10 p. m. of the 2d northeast storm warnings were displayed on the east Gulf coast from Bay St. Louis, Miss., to Cedar Keys, Fla., in connection with a disturbance of moderate intensity that developed over the northeastern Gulf of Mexico and moved slowly westward. It gradually lost intensity and apparently dissipated on the 4th. The lowest barometer reading reported was 29.72 inches at Burrwood, La., and the highest wind velocity, 32 miles an hour from the east at Pensacola, Fla.

On the evening of the 7th a disturbance of marked intensity was central over Lake Erie, moving northeastward, and storm warnings were ordered displayed at 10 p. m. from Delaware Breakwater to Eastport, Me. The following morning the storm warnings were changed to small-craft warnings, the storm having decreased in intensity during the night. The highest wind velocity reported was 48 miles an hour from the south at Atlantic City, N. J.

Small-craft warnings were displayed from Delaware Breakwater to Nantucket, Mass., on the 10th; from Baltimore, Md., to Eastport, Me., on the 23d; from Delaware Breakwater at Eastport, Me., on the 25th; and from Cape Hatteras to Nantucket, Mass., on the 26th.

At 9:30 p. m. of the 12th the first advisory warning was issued regarding the disturbance that formed east of Swan Island in the northwestern Caribbean Sea and moved slowly northwestward during the 12th-17th, inclusive. Frequent special observations by radio from the S. S. Chalmette on the 15th were of great assistance in locating the center of the disturbance on that date. Storm warnings in connection with this disturbance were displayed as follows: 9 p. m. of the 13th, Punta Gorda to Jupiter, Fla.; 8 a. m. of the 14th, north of Punta Gorda to Tarpon Springs, Fla.; 10 p. m. of the 14th, Cedar Keys, Fla., to Bay St. Louis, Miss. The highest wind velocity at a land station was 32 miles an hour from the east at Key West, Fla., on the 14th; while the S. S. Ellis reported 48 miles from the northeast on the 14th in latitude 25° 12′ N., longitude 85° 42′ W., and the S. S. Chalmette reported 48 miles from the west on the 15th in latitude 26° 00′ N., longitude 85° 42′ W. After its center reached latitude 28° N., this disturbance turned toward the northwest and decreased in intensity, passing inland between Pensacola, Fla., and Mobile, Ala., as a very slight disturbance, on the morning of the 17th.

On the evening of the 15th the first advisory warnings were issued in connection with another tropical disturbance that apparently developed immediately southwest of Jamaica on the 14th and moved slowly west-north-westward to the northern portion of the Yucatan Peninsula, thence southwestward over the extreme eastern portion of the Gulf of Campeche to the Mexican coast in the vicinity of Frontera, where it was apparently central on the morning of the 21st. This storm dissipated after moving inland, but heavy rains continued for a day or two longer over the eastern States of Mexico.

The lowest barometer reading reported during this storm was 29.06 inches, by the S. S. *Ceiba*, in latitude 20° 12′ N., longitude 87° 6′ W., on the morning of the 18th, at which time the wind was blowing 64 miles an hour from the south. On the 20th the S. S. *Hibueras*, in latitude 20° 10′ N., longitude 92° 06′ W., reported a wind of force 12 from the northeast. The lowest barometer reading reported by this vessel was 29.42 inches.

The following press dispatch from Mexico City, dated October 22, was published in the morning papers of October 23.

Reports received here from Vera Cruz, Progresso, Tampico, Tuxpan, and other ports indicated that the storm which has swept the Gulf of Mexico in these regions during the past few days has done considerable damage to shipping. Several small vessels were sunk. The Ward liners Esperanza and Morro Castle are still outside Vera Cruz unable to enter the harbor after having fought the waves for two days.

Later press reports refer to an urgent call for help having been received from the governor of Quintana Roo, eastern Province of Yucatan, who telegraphed that the entire coast had been lashed by a severe storm, destroying property and crops and causing some loss of life. The islands of Mujeras and Cozumel, off the north-eastern coast of Yucatan, were reported to have been swept bare. Newspaper dispatches from Yucatan reported the foundering of several small vessels.

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The fishing smack Ida S. Brooks was caught in the storm north of Cozumel Island, the eye of the storm passing very nearly over her, as indicated by the distinct lull noted between a whole gale to hurricane from the north, shifting to a full hurricane velocity from the southeast. The sloop was carried northward over the reefs, bumping many times, and finally wrecked on Contoy Island, where the crew managed to get ashore. They were taken off three days later by the S. S. Hibueras, which had ridden out the storm in the Gulf of Campeche.

The following letter, dated October 27, 1922, from the manager of the Marine Department, Standard Oil Co. of New Jersey, tells of the use made by that corporation of the advices issued by the Weather Bureau in connection with the storm of the 14th-21st.

During the hurricane in the Yucatan Channel and the Gulf of Mexico last week a number of our steamers were in close proximity to the center of this disturbance.

Due largely to the accurate and prompt information which we received daily from your office and Mr. Kimball, of your New York office, we were able to keep the masters of our vessels fully advised of the course this storm was taking, thus enabling them to keep clear of the center of the storm and perhaps preventing the loss of both life and property.

life and property.

We wish to take this opportunity of expressing to you our thanks for the valued services rendered, which are greatly appreciated.

The highest wind velocities reported from Mexican stations were 60 miles from the northwest at Vera Cruz and 56 miles from the northwest at Puerto Mexico on the 20th. Reports from stations farther east were missing. Advisory warnings in connection with this storm were issued twice daily until the 21st. The radio reports received from ships were invaluable, especially the regular and special reports from the steamers Zacapa, Hibureas, and Ceiba, without which reports it would have been impossible to have reported the course of the storm accurately.

A communication concerning the meteorological conditions in the Canal Zone preceding and during the formation of these two disturbances of the 12th-17th and the 14th-21st, and the uses to which the storm advices were put, has been received from Mr. R. Z. Kirkpatrick, Chief Hydrographer, Canal Zone. The following are extracts from the letter:

Reference is made to the recent predictions on the West Indian hurricanes, which were promptly received by cable and via Swan Island. These messages were broadcast by radio and by notices to mariners, as fast as received here. They were instrumental in causing some of the boats in the New Orleans trade to postpone their sailings for a day or two. So far, not many marine casualties have been reported.

The few days preceding the appearance of the first disturbance in the Caribbean on the 12th were accompanied by an unusually low barometer on the Canal Zone, the average pressure for the 11th being 29.79 inches. By the 14th this average had increased to 29.87 inches. Southerly winds prevailed from October 8 to 17, inclusive. In the early morning of the 13th a strong wind was experienced on the Pacific coast, attaining a maximum velocity of 36 miles per hour shortly after noon of the same date. An unusual total wind movement of 425 miles was recorded at Balboa Heights on this date, but by midnight the velocity had decreased to 3 miles per hour: then local influences caused a short period of north wind, which later changed to south again at daybreak. This southerly blow, although experienced at Balboa Heights and Cape Mala, was not very pronounced at Cristobal.

The canal and shipping interests appreciate the prompt service given by the Weather Bureau and the Swan Island radio.

It will be noted that the wind direction and movement were unusual, being from the south from the 8th to the 17th, inclusive. A similar radical departure from the normal wind régime occurred in October, 1921, preceding the formation over the southwestern Caribbean of the hurricane of that month.

In connection with this, reports have come out of the Magdalena Department of Colombia of a storm which swept that region during the 48 hours between October 10 and 11, with great destruction to the banana plantations. The connection between this storm and the disturbance noted over the western Caribbean on the 12th seems obvious.

From the 26th to the 29th, inclusive, advisory warnings were issued daily in connection with a disturbance that appeared south of the Louisiana coast on the morning of the 26th and moved slowly eastward with diminishing intensity and another that moved northward from the central Gulf during the 28th-30th, passing inland on the Mississippi coast on the latter date. Small-craft warnings were displayed from Mobile, Ala., to Cedar Keys, Fla., on the 29th. The highest wind velocity reported was 40 miles an hour from the east at Pensacola, Fla., on the 29th.

Frost warnings were issued for a considerable area in the Washington forecast district on the following dates: 12th, 13th, 17th, 18th, 19th, 20th, 23d, 24th, and 26th. These warnings were well verified, as a rule. No warnings were issued, however, for sections farther south than central Mississippi, northern Alabama, northern Georgia, and South Carolina.—Chas. L. Mitchell.

CHICAGO FORECAST DISTRICT.

At the beginning of October killing frost has been experienced over only a few areas in the district, but by the close of the month it had occurred southward almost to the southern limits, the exceptions including southwestern Kansas, southeastern Missouri, extreme southern Illinois, and the region immediately surrounding southern Lake Michigan. Frost warnings were issued from time to time as the occasions seemed to require, and, in the main, and including the more important occurrences, they were verified. The dates on which warnings were disseminated follow: 2d, 4th to 12 inclusive, 14th, 16th to 19th inclusive, and 23d. Those issued on the 11th, 12th, 16th, 17th, and 18th were the most general in both scope and importance. Frost warnings for the Wisconsin cranberry interests were discontinued with those issued on the 2d.

On the Great Lakes the first decade of October was quiet, no winds of storm force occurring. The remainder of the month, however, showed a marked increase in storm activity, expecially over the extreme eastern portions of Lakes Erie and Superior and northern Lake Huron. At Buffalo, N. Y., wind velocities of verifying force occurred on five dates and at Alpena, Mich., on four dates.

The first storm warning for the month was issued on the afternoon of the 13th in connection with a disturbance that was moving rapidly eastward over northern Minnesota, southwest warnings being ordered for all upper Lakes stations, excepting Duluth, Minn. Although the disturbance decreased in strength as its center passed eastward immediately north of the upper Lakes, nevertheless verifying velocities occurred over northern Lakes Huron and Michigan and eastern Lake Superior.

On the afternoon of the 16th a weak disturbance of the Alberta type that had reached the Lake region increased considerably in energy, and during the ensuing 24 hours moved rapidly northeastward to the mouth of the St. Lawrence River. Winds of storm force, mostly from the northwest, were attained within the following 36 hours on the eastern shore of Lake Michigan, over the extreme eastern portions of Lakes Erie and Superior, and on Lake Onfario. At the morning observation of the 18th northwest warnings were issued for Lakes Huron and Ontario, eastern Lake Erie, and extreme eastern Lake Superior, but these were lowered a few hours later when it seemed apparent that the gradient was about to decrease rapidly. However, there was a redevelopment over Ontario, Canada, on the night of the 18th-19th that resulted in a maximum velocity of 56 miles an hour from the west at Buffalo, N. Y., on the 19th.

On the morning of the 23d a distubance of considerable intensity was central north of Lake Ontario. Northwest warnings were issued for Lake Ontario, and southwest warnings for Lake Erie from Dunkirk to Tonawanda, the latter by the Buffalo, N. Y., official. Likewise, the Alpena, Mich., official issued northwest warnings at 10:30 a. m. for the Alpena section of Lake Huron. All these

warnings were verified.